The Magazine for ENERGY EFFICIENCY in Compressed Air, Pneumatics, Blower and Vacuum Systems

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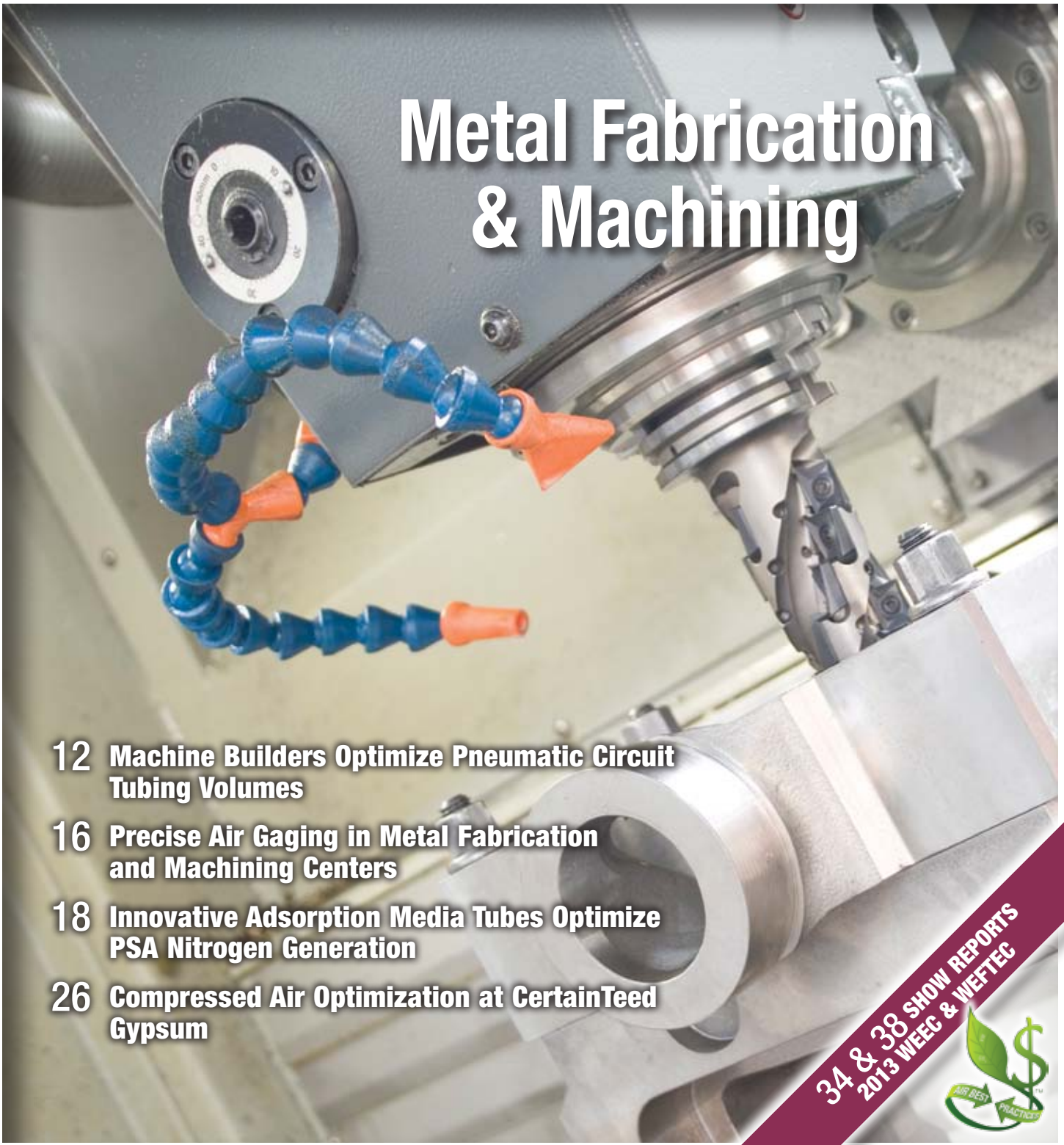
November 2013



Metal Fabrication & Machining

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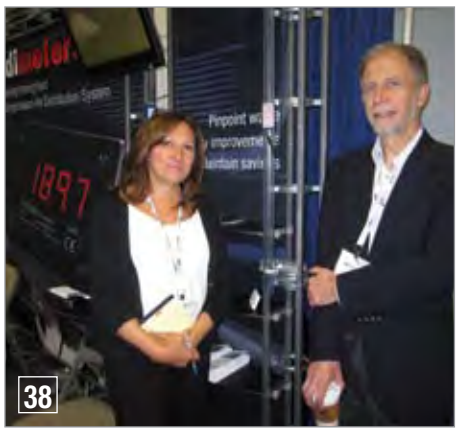


FROM THE EDITOR | Metal Fabrication and Machining

I'd like to take this space to thank rotating Editorial Board Members for their time and advice they have provided us. We'd also like to welcome new Board Members listed in the table to the right. Lastly, I'd like to congratulate our Board Member Thomas Mort, from Archer Daniels Midland, for being honored with the Energy Manager of the Year Award by the Association of Energy Engineers at the World Energy Engineering Conference!

Metal Fabrication and Machining shops are seemingly everywhere. They all use compressed air and a vast majority are smaller businesses. This vertical market is one where compressed air systems do not tend to receive energy-efficiency system assessments and where optimization opportunities abound.

The energy conservation team at SMC USA provides us with a subtly powerful article on the inefficiencies built into most machines — as it relates to compressed air consumption. Please take a look at how they analyze excessive pneumatic circuit tubing volumes, on OEM machines, for energy efficiency opportunities.

Inappropriate end uses and shutdown optimization techniques have become buzzwords for compressed air system assessments. One example is the air gaging most machine shops use to perform precise quality checks on their products. Stotz USA is a leading manufacturer of these gages and they provide an example of how a simple valve/sensor combination can ensure these gages only consume compressed air — when they are being used.

We have a true innovation in the compressed air industry. Please read the article titled, "Innovative Adsorption Media Tubes Optimize PSA Nitrogen Generation", written by Colin Billiet from nano-porous systems. We are also fortunate to receive a case study on a compressed air optimization project at CertainTeed Gypsum from the Compressed Air Challenge®. We also present an article from the Compressed Air & Gas Institute titled, "Why do Compressed Air Systems Need Drying?"

The Fall is a busy season for trade shows. Our publication enjoys attending and distributing our magazine at many trade shows focused on end users markets. We hope you enjoy our Show Reports on the World Energy Engineering Conference and the blower technologies at the 2013 WEFTEC Show.

FABTECH 2013 will be held November 18-21 at McCormick Hall in Chicago. We are proud to be a *Supporting Publication* and hope you can visit the show. Please stop by the Compressed Air Best Practices® Magazine booth (#N2845) and say hello!

ROD SMITH
Editor
tel: 412-980-9901 • rod@airbestpractices.com

COMPRESSED AIR, PNEUMATICS, VACUUM & BLOWER INDUSTRY NEWS

John Bouchard & Sons Named Samsung Centrifugal Compressor Distributor for Tennessee and Southern Kentucky

John Bouchard & Sons Co. has been named the distributor of Samsung Techwin Centrifugal Air Compressors for the entire State of Tennessee and for the Southern Kentucky counties in the Tennessee Trade Area. This selection by Samsung is among several new partnerships established in a worldwide expansion, specifically in North and South America.

John Bouchard & Sons has over 20 years of proven experience and unmatched customer support in the centrifugal compressor market with a combined service experience of over 50 years working on centrifugals, and another 100+ years of combined sales and engineering experience in the compressed air industry. The addition of Samsung Techwin further enhances John Bouchard & Sons compressor offerings for the industrial marketplace, including models from 125 HP to well over 20,000 HP.

The turbo compressors were developed using Samsung's Gas Turbine technology and Aircraft Engine expertise from the 1970's.

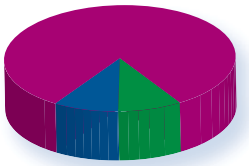
"We believe in hard work, honesty in all of our business dealings and the 'merit shop' philosophy. We always strive to be invited back after earning the opportunity to work with a customer," says William Morgan, the President of John Bouchard & Sons Co. "We are excited about this new opportunity because we believe Samsung Techwin offers a superior product that will allow us to strengthen our reputation as one of the strongest 'air houses' in our market."

About John Bouchard & Sons Co. — JBS is a 113 year-old company that started as a blacksmith shop at our Nashville, TN location in 1900. This fifth-generation, family owned company serves modern industry through four fully integrated divisions. These divisions are organized under Equipment Sales, Machine Services, Foundry Products, and Construction Services. The Compressed Air Department is integrated into Equipment

Sullair Compressors with EES Yield Quantum Cold Weather Savings

Did you know . . .

Today's energy costs represent 82% of the expense of compressor ownership.



- *Equipment*
- *Maintenance*
- *Energy*

Save on Energy Costs

The Sullair compressors with Energy Efficiency System (EES) heat recovery were developed to produce the most cost-effective compressed air solution in the marketplace. The Sullair EES recovers the heat of compression and re-circulates it for comfort heating in plants for cold weather operations during winter months, or provides pre-heated air for boilers or processes. When not in use, the thermostatic controls exhausts heated air to the outside. This 100 hp compressor generates 1,649,000 BTUs per year. Annual energy savings from the EES alone may reach $10,993.00*, with a payback period of 7 months as a result of the energy savings.

Additional energy savings may be achieved by combining the EES with Variable Capacity Control** and Variable Speed Drive**, which provide flexibility to vary both capacity and pressure to match system demand, and result in maximum effectiveness in reducing total life cycle costs. Part load capacity and efficiency benefits can produce additional energy savings up to 17 percent.

** Calculations are based on climate conditions for Chicago, IL and natural gas at $0.50/therm (subject to market fluctuations).*

*** Not available on all configurations.*

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Sales and includes Sales, Service, Parts, a Rental Fleet, and Turn-Key Installation capabilities. John Bouchard & Sons employs around 130 people, and also has offices in Knoxville and Chattanooga, TN. *For more information about Samsung Techwin Centrifugal Compressors, call 1-800-842-9156, email compressors@JBouchard.com, or visit www.JBouchard.com*

About Samsung Techwin — Samsung Techwin strives to lead the compression system industry by developing technology that covers industrial air compressors, engineered compressors for process applications, gas compressors, expanders and power generation systems. *For more information, call 1-281-599-3377 ext.214 or email redlopez@samsung.com*

CAGI Website Expanded

The Compressed Air and Gas Institute (CAGI), which has provided manufacturer and product neutral support to compressed air professionals for more than 90 years, has announced expanded content on the CAGI website, www.cagi.org. The expanded content provides additional information concerning the application and safe and efficient use of compressed air. Changes have been made to three sections of the website: Performance Verification, Working with Compressed Air and News.

Performance Verification

CAGI members recognize the importance of making the right decision when purchasing compressed air system equipment. The members have made it easier for buyers to make energy efficiency comparisons by developing standards and a simple format for comparing the energy performance of competitive products. Participants in the CAGI Performance Verification Program have gone further by having performance claims independently verified. The sheets can also be accessed via the Performance Verification tab on the CAGI website, as well as, on section members' websites.

Working with Compressed Air

Found under Working with Compressed Air on the CAGI website are calculation tools associated with the installation, use and application of compressed air systems. Calculators that determine water in air, pressure drops and oil carryover, among others, assist system designers and users with the information required to make educated compressed air system decisions.

News

Under the News tab of the website are three new additions: Calendar of Tradeshows, Industrial Magazines and CAGI Produced Articles. The tradeshow calendar directs visitors to a list of upcoming, industry-related tradeshows. This section will also highlight CAGI member participation in tradeshows.

Within the Industrial Magazines section, website visitors can link to trade and industrial publications that cover the subject of compressed air on a regular basis. The CAGI Produced Articles section offers unbiased technical, educational and promotional articles written for CAGI on various compressed air topics.

"The CAGI website is an excellent information resource for compressed air professionals," said Paul Humphreys, CAGI member. "With the addition of expanded content as well as the

ability to download individual chapters of the Compressed Air and Gas Handbook, the CAGI website will continue to serve as the authoritative online destination for unbiased technical and educational information about the compressed air and gas industry."

For more detailed information about CAGI, its members, compressed air applications and other compressed air resources, visit the CAGI web site at www.cagi.org

New York Launches $19 Million Alternative Fuel Truck Voucher Program

Governor Andrew M. Cuomo announced a $19 million New York Truck Voucher Incentive Program to encourage the purchase of battery-electric commercial trucks as well as other energy-efficient transportation, including hybrid and compressed natural gas trucks.

The truck voucher program will include two voucher funds: $9 million for battery-electric truck vouchers offered in 30 counties around the state that did not meet federal clean air standards, primarily downstate New York, the Capital Region and Western New York; and a $10 million alternative fuels voucher fund for New York City, which also includes compressed natural gas, hybrid-electric vehicles and retrofitting diesel engines with emission control devices.

The New York State Energy Research and Development Authority (NYSERDA) is administering the program, with funding from the federal Congestion Mitigation and Air Quality (CMAQ) program and in partnership with the New York State Department of Transportation and the New York City Department of Transportation (NYC DOT).

The program is directed toward class 3 to 8 trucks, which include large pick-ups, delivery vans, box trucks, buses, tractor trailers, garbage trucks, and construction vehicles such as cement and dump trucks. Under the terms of the program, NYSERDA approved vehicle manufacturers, dealers and retrofit providers which will receive the vouchers, allowing them to pass on the full incentive in a lower vehicle price to buyers.

The electric truck vouchers will be available beginning today with vouchers accepted for purchases of eligible vehicles meeting program

COMPRESSED AIR, PNEUMATICS, VACUUM & BLOWER INDUSTRY NEWS

guidelines. The alternative fuels voucher and diesel retrofit funding for NYC will be rolled out in late August and September, respectively.

The transportation sector is responsible for three-fourths of petroleum consumption in this country, and 40 percent of greenhouse gas emissions in New York, so reducing emissions through alternative-fueled vehicles and improving the performance of diesel trucks can have a significant impact. NYSERDA estimates that this program could encourage the purchase or retrofit of up to 1,000 low-emission trucks in areas of the state with the poorest air quality.

"These investments have already helped dozens of companies operate greener fleets on New York City's streets," said NYC DOT Commissioner Janette Sadik-Khan. "With this new infusion we can now go the extra mile and convert an additional 500 trucks to cleaner technology so they can keep New York moving in a way that enhances the economy and the health of all New Yorkers."

Program details:

- $9 million is now available in vouchers up to $60,000 that can be used by companies, non-profits and state and local government entities toward the purchase of electric trucks and buses. This incentive is available in 30 counties around the state which do not meet the National Ambient Air Quality Standards and is for class 3-8 battery-electric trucks only. NYSERDA approved electric equipment manufacturers participating in the Truck VIP include AMP Trucks Inc., Boulder Electric Vehicle, Electric Vehicles International and Smith Electric Vehicles,
- $6 million will be available in vouchers up to $40,000 for the purchase or lease of Compressed Natural Gas (CNG), hybrid-electric or battery-electric trucks in New York City. This incentive also includes repowering a diesel truck with CNG. The funding is open to all private and non-profit fleets based in and operating 70 percent of the time in New York City, and will be available starting in August.
- $4 million to cover up to 80 percent of the purchase and installation of emission reduction equipment on medium- and heavy-duty diesel trucks such as diesel particulate filters. The funding is open to all private and non-profit fleets based in and operating 70 percent in New York City, and will be available starting in September.

CALSTART, a national non-profit organization focused on the growth of the clean transportation technology industry, was competitively selected to assist NYSERDA in managing the voucher program.

For more information on the New York Truck-Voucher Incentive Program, visit https://truck-vip.ny.gov/

Trillium CNG Building Compressed Natural Gas Station in Kirkwood, N.Y.

Trillium CNG, a business unit of Integrys Energy Group, Inc. (NYSE: TEG),will build a new high-volume, fast-fill compressed natural gas (CNG) public access station in KIrkwood, N.Y. to meet the fueling needs of Willow Run Foods Inc., a regional foodservice supplier and other local fleets.

The new CNG station will be built at 90 Barlow Road in Kirkwood, approximately 1 mile from Willow Run Foods' headquarters and distribution center. The station site is also 1/2 mile from Interstate 81, off the Colesville Road exit.

The CNG station will use Trillium's patented HY-C technology, a design that provides ultra-fast refueling for heavy-duty trucks. Initially the site will have two dispensers with room for expansion as demand for CNG in the area increases.

"We specialize in fueling heavy-duty trucks quickly and efficiently," said Mary Boettcher, president of Trillium CNG. "Our stations feature technologically superior and patented equipment that saves our customers time and money. We're glad to be bringing this fueling solution to Willow Run Foods and building our CNG network in the Northeast."

"Willow Run Foods has been concentrating on clean fuel projects for the past few years, and now, we'll be the first company to use CNG trucks for regional deliveries in the Northeast," said Terry Wood, Willow Run Food's president and chief executive officer. "Environmental responsibility is a priority of Willow Run Foods' and is important to our customers and the communities where they're located. That's why we'll continue to seek projects that are environmentally sustainable in the future."

About Willow Run Foods, Inc. — Located in Kirkwood New York, Willow Run Foods, an employee owned company, is the Northeast and Mid-Atlantic's premier fast food systems distributor providing one-stop shopping for chain restaurant operators in 14 states offering distribution, storage and logistic services. *For more information, visit www.willowrunfoods.com*

About Trillium CNG — Trillium CNG is a leading provider of CNG to fleets, and also offers complete facility design, construction, operation and maintenance services. Our focus is on fueling heavy-duty fleets that require high-performance solutions. Trillium CNG is a business unit of Integrys Energy Group, Inc. (NYSE: TEG). *For more information, visit www.TrilliumCNG.com*

Atlas Copco Included in Dow Jones Sustainability Index for Third Consecutive Year

The Atlas Copco Group (Atlas Copco AB) has been included in the Dow Jones Sustainability Index for the third consecutive year.

"Sustainable productivity lies at the heart of Atlas Copco's commitment to innovation and growth," said Jim Levitt, president, Atlas Copco North America LLC. "We continually strive to increase productivity in ways that make a positive impact on society and the environment and we are honored to be included in the Dow Jones Sustainability Index again in 2013."

Inclusion in the sustainability index is based on annual company assessments and comparison to industry peers. Key factors in this review include management of opportunities and associated risk that are derived from economic, environmental and social developments. Corporate governance and strategy, as well as key performance indicators like emission and waste, are also taken into consideration.

Earlier this year, Atlas Copco was named a "Leader" in the FTSE4Good Index, which measures globally recognized corporate responsibility standards in environmental, social and governance practices. Atlas Copco is also a member of the prestigious Top 100 Global Sustainable Companies and is ranked one of the world's most ethical companies by the Ethisphere Institute.

In 2013, Forbes magazine listed Atlas Copco among the world's 100 most innovative companies for the third year in a row.

Atlas Copco North America operates 111 locations and employs more than 4,600 people in the United States. The company had revenues of $2.8B in 2012, approximately one-fifth of the company's global revenue. *Learn more at www.atlascopco.us*

To read more ***Industry News*** articles,
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Machine Builders Optimize Pneumatic Circuit Tubing Volumes

By Jon Jensen, John Martin and Chris Latham, SMC USA

The advent of manifold mounted, plug-in pneumatic valves has been a boon for machine builders. It allows them to mount complete valve packages in a safe and secure location on a machine. Using a D-sub connector, serial interface module, or similar single-point wiring system, all of the electrical control outputs can feed into one location on the manifold, greatly simplifying the wiring. Plumbing issues are reduced, since a single air pressure line can be used to feed a common pressure gallery. The same advantage applies to the common exhaust gallery. No longer would both a plumber and an electrician be required to replace a valve, since any valve can be replaced without disturbing electrical connections or plumbing lines.

Excess Tubing Volume Can Increase Energy Costs

Like most advances, there can be some downsides to this type of arrangement, depending upon the application. One of these revolves around considerations for energy conservation. Most circuits include two air lines extending from the valve to the actuator, one for extend and one for retract. Each time the valve cycles, the actuator is pressurized on one side or the other. Of course, the hose or tube that connects them must also be pressurized. This tubing volume is typically ignored as inconsequential when doing our sizing calculations, but should not always be overlooked.

The tubing volume offers no work at all…only a means of transferring the energy of the compressed air to the actuator. Inconsequential? Maybe. But depending upon the application, those volumes can be significant.

The Distance from the Valve Manifold to Actuator

A packaging facility has corrugated boxes being erected at a mezzanine level and dropped down to the main floor where they are filled, sealed and palletized. The box drop-down employs gravity to lower the boxes, but incorporates a series of mechanical stops to sequence them as required. Each of the stops includes a pair of 2 inch bore x 1 inch stroke air cylinders to operate a brake that stops the box and releases

"The advent of manifold mounted, plug-in pneumatic valves has been a boon for machine builders. Like most advances, there can be some downsides… one of these revolves around considerations for energy conservation."

it when needed. In all, four stops are included for each drop down, meaning eight actuators in total and four valves to control them.

The directional control valves are located at a central location on a single manifold, presenting a clean and compact package. However, the distance from manifold to actuator varies from 10 feet to 25 feet. In operation, each time a valve shifts, it exhausts one length of tubing and fills another. Given the small volume, we might still think this to be inconsequential, but let's look at the numbers.

Valve Manifold

Quantifying Volume

Assume ¼" OD tubing with an ID of approximately .180". With the first station being 10 feet away from the valve, the volume of tubing going to the actuators is only 3.05 cubic inches. Since there are two lines from the valve to each actuator pair, the total volume is 6.10 cubic inches per complete cycle. To put this in perspective, each of the 2x1" cylinders has a total volume of 5-½ cubic inches. That's the sum of both the extend and retract sides. Since there are two of them, the total cylinder volume is 11 cubic inches. The volume in the tubing is over half that of the actuators. Much of the energy developed at the compressor is being used to fill the tubing lines.

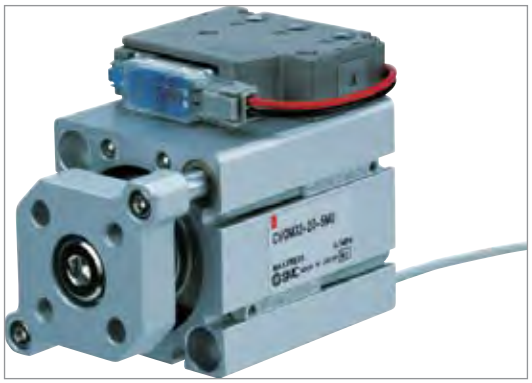
Let's leave aside the potential problem with poor response times, and just look at the costs. Let's also assume the working pressure to be 80 psi. Calculating the compression ratio to be 6.33, and multiplying that by the volume, the normalized volume becomes 38.6 standard cubic inches. If we have the cylinders being actuated five times a minute, we will be consuming 193 standard cubic inches per minute, or using more meaningful terms, 0.11 scfm. That is just for filling the air tubing to the closest single station on the drop-down.

How about the other 3 stops on the drop-down? The chart below shows the air volume for each of the stations, with a total for all. Please note the total volume of the airlines extending out to the cylinders is 42.8 in³. When we calculate the total volume of all eight cylinders we

	TUBING LENGTH (INCHES)	TUBING VOLUME (CUBIC INCHES X2)	TUBING VOLUME X COMPRESSION RATIO (CUBIC INCHES)	X 5 CYCLES PER MINUTE (SCIM)	SCFM
Station 1	120"	6.1 in^3	38.6 in^3	193 scim	.11 scfm
Station 2	180"	9.16 in^3	58.0 in^3	290 scim	.17 scfm
Station 3	240"	12.2 in^3	77.2 in^3	386 scim	.22 scfm
Station 4	300"	15.3 in^3	96.8 in^3	484 scim	.28 scfm
Total	840"	42.8 in^3	270.6 in^3	1353 scim	.78 scfm

MACHINE BUILDERS OPTIMIZE PNEUMATIC CIRCUIT TUBING VOLUMES

get 44 in³. The volumes are almost identical. Now we have a situation where half the compressed air is consumed filling all the air lines.



Pneumatic cylinder with mounted directional control valve

If that single drop down operates 24/7 and the cost for electricity is $.10 per KWh, the annual cost to fill those lines is about $110, the same costs we incur to fill the cylinders. With multiple drop-downs, the costs are multiplied. Staying with our example, the facility has 50 packaging lines, for an annual cost of $5500.

Do Your Machines Have Long Compressed Air Feed Lines?

While this may be viewed as an extreme example, think back on all the applications where long air feed lines were employed in order to have a clean valve package. Or consider the oversize tubing that was utilized just because it was handy. Many of us might figure that larger tubing is better anyway, and everything will run more efficiently. However, please take into account that the larger tubing may double the volume to be filled without adding any productive benefit at all.

What happens to the same example when 3/8 inch tubing is used instead of the ¼ inch? The tubing ID increases to .27 inches and the volumes increase by a factor of 2.28, as do the costs. Now the annual price tag has jumped to $250. Again…that is just to fill the tubing for one drop-down.

As a side note, there is also some potential for liquid moisture build-up in those long lines when an excess of air is left between the valve and the actuator, even when good air filtration and drying is in place. Problems can arise due to the adiabatic expansion that occurs with each exhaust cycle. Condensation may occur as the exhausting air temperature falls below that of the atmospheric dew point. With long air lines and many cycles, the moisture may not be completely exhausted and can accumulate in the lines. That accumulation will occur near the actuator ports and will eventually work its way into the actuator, shortening its life.

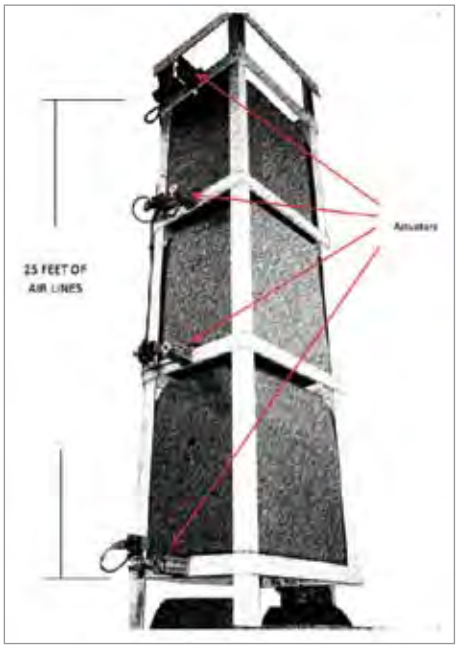


Illustration of application requiring extra tubing volume

The Solution

What's the solution? Have the valves mounted on or near the actuators so that all or most of the air volume is used to actuate the cylinders. This will require a pressure line running the length of the drop-down with a connection to each valve. However, that pressure line represents energy capacitance that works in our favor. We will also have fewer connections, which translates into fewer potential leaks. Of course, the downside is that electrical lines will have to be extended independently to each valve. However, with low voltage, low wattage coils, this probably is not that difficult. Another benefit to be gained is that electrical response times remain unaffected, while pneumatic response times improve dramatically.

The dollar savings is the reduction in air consumption by half. In our plant, that could be up to $5500.00 every year.

Reducing the costs for compressed air needs to be an ongoing project for any company that uses substantial amounts of air as part of the manufacturing process. There is a tendency to approach the issue at the compressor room and look for answers there. The resulting recommendations can be expensive as well as require a long ROI. However, dealing with demand side issues, as described here, offers an easy solution that can be incorporated at the OEM level with little additional cost. A case can even be made for modifying these types of applications in the field when machines come due for refurbishment. Addressing these "inconsequential" issues will offer significant savings on the bottom line. "Watch the pennies and the dollars take care of themselves". BP

For more information contact Jon Jensen, Energy Conservation Group Manager, SMC USA, tel: 630-449-0562, www.smcusa.com

To read more ***Pneumatic System Assessment*** articles, visit www.airbestpractices.com/system-assessments/pneumatics

Precise Air Gaging in Metal Fabrication and Machining Centers

By Chris Koehn, President, Stotz USA

Air gaging relies on a law of physics that states flow and pressure are directly proportionate to clearance and react inversely to each other. As clearance increases, air flow also increases and air pressure decreases proportionately. As clearance decreases, air flow also decreases and air pressure increases.

This is accomplished by having a regulated air flow that travels through some type of restriction such as a needle valve or jeweled orifice and then through the nozzle in the air tool. As the obstruction (workpiece) is brought closer to the nozzle, air flow is reduced and the back-pressure is increased. When the nozzle is completely obstructed, the flow is zero and the back pressure is equal to the regulated air. Conversely, when the nozzle is open to the atmosphere, air flow is at a maximum and the back pressure is at a minimum.

Brief History of Air Gaging

Air gages were first developed in France before World War II by a carburetor company that was looking for a more reliable method of measuring its carburetor jets. These air gages used a simple back pressure technology and provided the basis for the development of virtually all air gaging styles used today. This design was much improved in 1943, when a U.S. patent was granted for a simple back pressure system that incorporated the newly developed air pressure regulator. Many improvements in air gaging systems and styles have been developed through the years.

Types of Air Gaging

There are several varieties of air gaging systems that include back pressure bleed, differential and flow type systems.

The back pressure bleed system is the most versatile. Tooling from different air gaging systems may be used with this type. It is configured with an air pressure regulator to control the incoming air pressure to ensure maximum linearity. It is the second restriction that allows the user to adjust for different air gage tooling by adjusting the incoming air pressure to match the style of air tooling used. This type uses two setting masters to calibrate. The masters are typically at the MIN and MAX of the tolerance of the workpiece. This allows for linearity of the measurement through the entire measuring range. Because it is a two master system, each time you calibrate, you are compensating for any wear, dirt build-up or minor damage to the tooling.

The differential system divides the air stream into two fixed restrictions. One side ends in a zero valve, which balances pressure to the fixed second leg of the system, which ends at the air ring or plug. The difference between these two legs is measured by a differential pressure meter that bridges the two legs. This type uses a single master to set it to zero. Tooling for this type of system needs to be ordered for each particular magnification. This system is not as forgiving with worn or damaged tooling because you are using a single calibration point. Any part not made near the zero is more likely to have an inaccurate reading. This becomes more of an issue as you reach the outer limits of the tolerances.

The flow system is measured and read in a flow meter tube that supports a float. This system uses two masters for calibration. It is

similar to the back-pressure bleed system in its accuracy across the tolerance range. The range of magnification is adjusted by changing flow tubes and scales and is not as simple as the back-pressure bleed system. The flow system requires a much higher volume of air which requires much larger nozzles. Because the nozzles are larger, the nozzle must be kept closer to the part and therefore has a smaller nozzle drop. This can shorten tool life. The flow system can be used with long hoses without affecting the response time of the amplifier which makes it the ideal candidate for long holes such as gun barrels.

Use Compressed Air Efficiently

Air gages are actually engaged measuring, on average, only ten percent of the time. Most plants, however, leave them on 100% of the time causing them to continuously consume compressed air. It is recommended to request and use a air reduction valve, featuring a digital I/O regulator switch connected to the air column, able to turn off the compressed air flow when the unit is not measuring a part.

Why Use Air Gaging Today?

Air gaging is a very fast, efficient and reliable method of measuring. It is designed to be used on workpieces with tolerances of 0.005" or smaller. The resolution and repeatability of the measurement can be in the millionths of an inch. Because air gaging is a non-contact method, it is useful for measuring soft, highly polished, thin walled and other materials susceptible to marking. Air gaging is extremely easy to use and requires no special skills for the operator. Multiple operators will achieve the same or nearly the same measuring results when measuring the same part, thus taking operator technique out of the measurement results. This is a problem when you using a contact gage such as a micrometer or dial bore gage.

Air gaging can be used to measure complex geometric tolerances such as diameter, taper, parallelism, squareness, flatness and matching of components in a very fast and efficient method. These may not be able to be checked with fixed limit gaging or may be costly and time consuming to check in a different way. The size of probes continues to get smaller and smaller and can now be as small as 0.6mm (0.024") in diameter.

Many of today's columns and/or measuring computers can become an integral part of the manufacturing cell with communication to robotic loaders and the ability to send offset values to the machine, which allows for around the clock manufacturing with 100% inspection of workpieces.

Air gaging systems operate at air pressures that can remove contaminates such as abrasive particles and coolant, which will eliminate the need for a separate cleaning in most applications. The air tooling has no moving parts and therefore has a very long and dependable service life.

Air gaging technology is continually improving as computer technology continues to evolve. These systems can range from simple desktop readouts to full SPC computers with contour scanning capabilities. As manufacturing requirements continue to become more complex, air gaging technology evolves to meet the demand. For these reasons, air gaging will remain a viable measuring solution for generations to come. BP

For more information please contact Chris Koehn, President, Stotz USA. tel: 815-297-1805 or visit www.stotz-usa.com

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INNOVATIVE ADSORPTION MEDIA TUBES OPTIMIZE PSA NITROGEN GENERATION

By Colin Billiet, nano-porous systems

➤ Introduction

Nitrogen is primarily used as a clean, dry inert gas where the reduction of Oxygen is required for certain products and processes. It is widely used in the food and beverage, electronics, laser cutting, chemical and oil & gas industries. The cost of producing Nitrogen by separating compressed air using Pressure Swing Adsorption (PSA) is significantly impacted by the treatment of the compressed air supply. The introduction of Adsorption Media Tube (AMT) technology in order to dry the compressed air prior to separation offers the potential to reduce compressed air energy costs up to 25%.

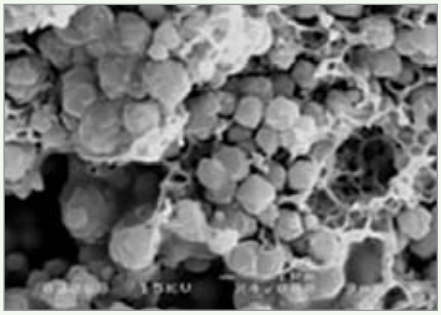
Background

The production of Nitrogen gas from a compressed air source is well known. Employing selected Carbon Molecular Sieve (CMS) and utilizing Pressure Swing Adsorption (PSA) technology enables the supply of various purities of Nitrogen to be produced by the user on site. The purity of the compressed air supply is however an important consideration since it is unsuitable for use without some form of treatment to improve its purity.

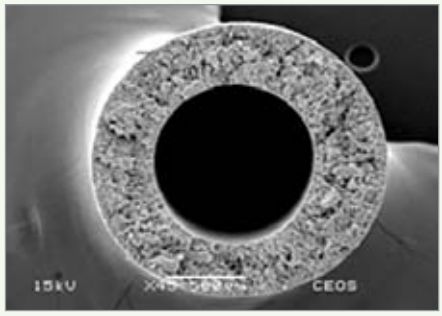
Compressed air contains contaminants such as water, oil and particulate which must be removed before use. Treating compressed air has generally involved filtering (to remove oil/water aerosols and dirt) and drying (to remove water vapour). The cleanliness of the compressed air has a direct effect on the operation of PSA Nitrogen generators.

Pressure Swing Adsorption Process — Simplified

A twin tower dryer PSA Nitrogen generator (Figure 1) operates by removing Oxygen through molecular adsorption onto a bed of granular CMS from the feed air (typically at 100 to 150 psi) as it flows up through a packed bed of CMS (Column A). Column B (having been previously used) is depressurised and Oxygen is released from the CMS due to



SEM image of the macro-porous polymer binder used in the adsorbent media tubes and 1 - 2 µm Zeolite crystals.



SEM image of the cross section of an adsorbent media tube. Typical dimension are: 2 mm outside diameter and 1 mm bore. Air flows through the bore of the AMT where adsorption/desorption takes place.

The open structure and clear adsorption sites allow contaminants to move in to and out of the structure very rapidly, making the adsorption tubes extremely efficient adsorption devices. With the fast kinetics, it can be regenerated quickly and efficiently.

the expansion of the clean, dry Nitrogen gas within the bed. Dry purge gas from the outlet of Column A is fed through a control orifice, expanded to near atmospheric pressure and flowed in counter-current flow down through column B to sweep the bed of concentrated Oxygen. The cycle of operation is set to achieve the desired output purity of the Nitrogen outlet stream. When the CMS in column A becomes saturated with Oxygen (usually determined by a simple timer controller) the feed air is switched back to Column B after it has been pressurized and the cycle continues.

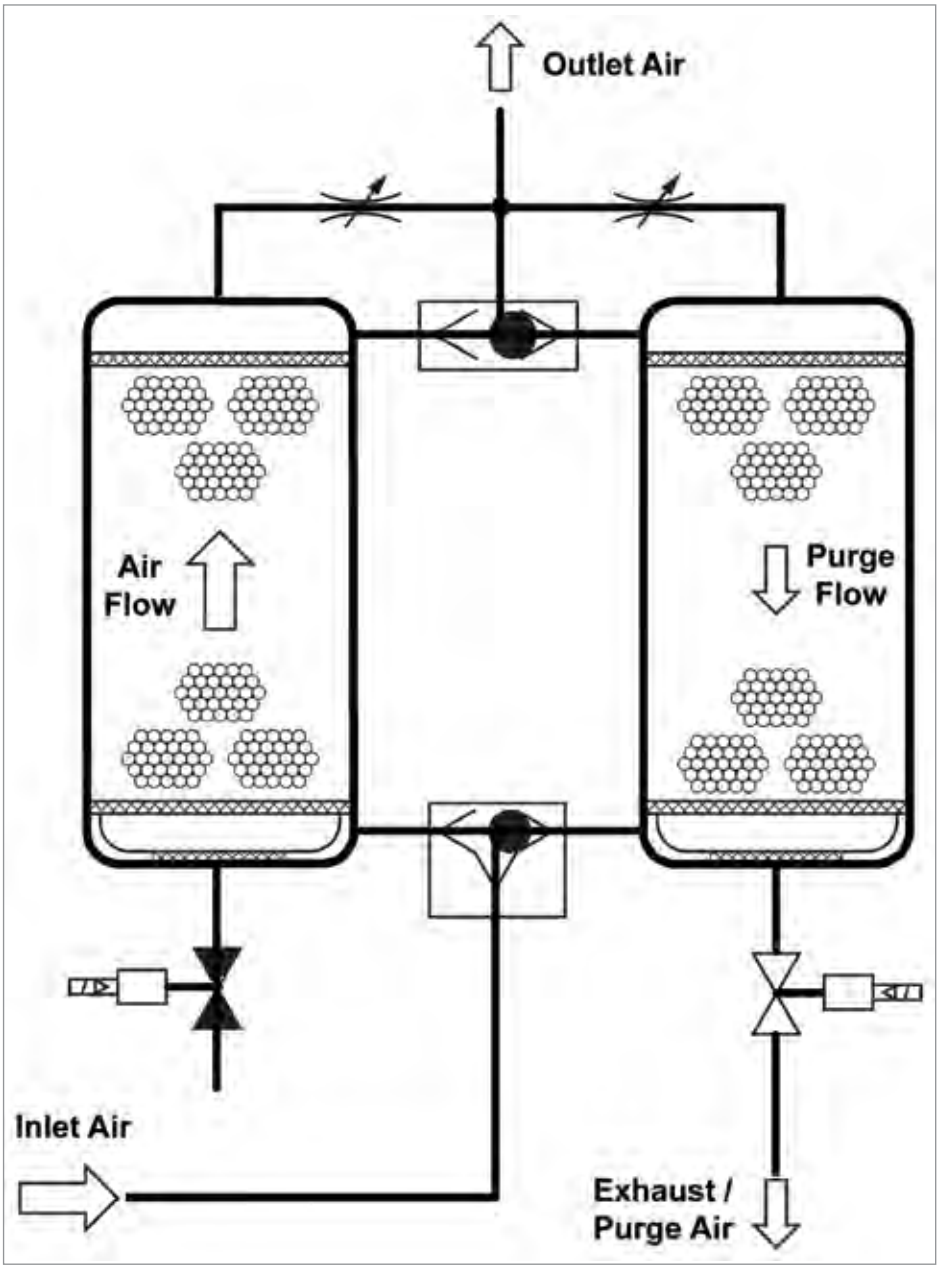


Figure 1 — PSA Process (Simplified)

INNOVATIVE ADSORPTION MEDIA TUBES OPTIMIZE PSA NITROGEN GENERATION

Effects of Water Vapour on the Generation Process

Fast gases such as water vapour and CO_2 along with Oxygen are adsorbed by the CMS. Water vapour content is significant and its presence will affect the efficiency of the Nitrogen generation process (US 4,439,213). It has been recognized that the treatment of the inlet compressed air is therefore an important consideration. Suppliers of PSA Nitrogen generators recommend various levels of dryness. Generally, the drier the compressed air, the better.

Compressed air at 95 ˚F (35 ˚C) and 100 psig (7 barg) has a water vapour content of 4,950 mg/m^3.

There are 2 main options to reduce the water loading:

- Refrigerated dryers typically provide a 38 ˚F to 50 ˚F (3 ˚C to 10 ˚C) pressure dew point. At 100 psig (7 barg) the water vapour content in compressed air is up to 1,170 mg/m^3, a 76% reduction.
- Desiccant dryers typically provide a -40 ˚F (-40 ˚C) pressure dew point. At 100 psig (7 barg) the water vapour content in compressed air is 15 mg/m^3, a 99.5% reduction.

Desiccant dryers may be preferred due to the low residual water vapour; however, the requirement for regeneration air, at typically 20% of the inlet air, results in a need for a larger compressor which increases capital investment, lengthens the ROI period and increases the per cubic foot Nitrogen production costs. The use of a refrigerated dryer eliminates the requirement for purge air and reduces the capital cost but introduces up to 78 times the water vapour onto the CMS bed. Generally, it is assumed that for high Nitrogen purities, higher quality inlet air is most important. The dryness of the delivered Nitrogen is generally expected to be very dry so, the use of the CMS column to carry out drying, for which it is not best suited, is best avoided.

The selection of the dryer type is therefore often a compromise between the dryness of the air produced and the impact on the cost of Nitrogen produced.

Granular Adsorbent Limitations

Granular desiccant adsorbents are widely used to remove contaminants such as water vapour from gases including air (see Figure 2). The properties of such technologies are well defined but their use is limited in certain applications. These limitations include orientation, vibration, high pressure loss, attrition, channelling, by-pass and high regeneration energy (purge).

Figure 2 — Granular Desiccant

The powdery appearance of the adsorbent beads indicates that dust is readily shed in use, contaminating the outlet air stream. Typical life expectancy is 24,000 hours or less.

The irregular size and shape of the beads can lead to attrition and channelling due to poor packing of the bed.

Exposure to Bulk Water

Typically desiccant material has to be changed every 36 months due to the limitations described above. Exposure to bulk water is common when water in liquid and aerosol phase is not adequately removed prior to the dryer resulting in the breakdown of desiccant beads. Desiccant breakdown is not reversible since, once exposure to liquid water occurs, the entire adsorption bed will require replacement. This is costly and disruptive to operators and is not a practical proposition to integrate into large systems.

In small systems (such as a 0.2 cfm module used for beverage dispense), a beaded desiccant dryer may be integrated. However, the life of the relatively small quantity of desiccant is aligned to that of the compressor which typically has a life of up to 10,000 hours where duty is not continuous.

Larger Industrial Systems

For larger systems requiring continuous duty, this scenario is not practical. CMS is not normally considered to be subject to regular servicing (replacement) since it has an expected life of 10 years assuming a high standard of inlet air purity. In this case, the service life of desiccant beaded material is not aligned with the life of the CMS. Should the air treatment system malfunction and bulk water come into contact with the desiccant material, the CMS would be damaged and require replacement, an unacceptable and costly scenario to users.

Innovative Technology

A novel approach is now available whereby the benefits of an integrated drying stage can be realized.

Adsorption Media Tube (AMT®) tube technology is manufactured from multi-layer materials which incorporate application specific adsorbents in their structure. They are best described as adsorbent tubes (typically 2 mm in diameter and 0.7 mm bore) consisting of a high level of adsorbent (≥ 80%) and a non-adsorbing durable polymeric binder called Polyether Sulphone. AMT is extruded into a water bath where a phase inversion takes place and its structure is formed. AMT is therefore totally resistant to bulk water. The open structure of the AMT provides for low mass transfer resistance enabling the flow of air or gas to permeate easily into the structure while offering very low pressure losses.

AMT technology leverages the proven adsorption capabilities of Zeolite Molecular Sieve powder but packages this powder in a proprietary way to allow faster and easier adsorption and regeneration.

Rather than using a clay binder necessary to form the adsorbent crystals into beads, AMT uses a durable polymer. The polymer has microscopic voids formed during the manufacturing process which allows easier access for the contaminant into the active pores in the sieve.

Dust

AMT does not shed dust due to the use of the polymeric binder.

INNOVATIVE ADSORPTION MEDIA TUBES OPTIMIZE PSA NITROGEN GENERATION

Figure 3 — Granular Desiccant vs. AMT in water

Figure 4 — Nitrogen Generator with Integrated AMT Dryer

Failure Mode

If the adsorbent tubes are overloaded with water there is no physical damage. Outlet dew point will be affected but will recover after normal operation is resumed.

Figure 3 below shows the release of powder from adsorbent beads in water. The crush strength of the beads is reduced significantly. Under pressurized conditions experienced in pressure swing adsorption dryers, the beads will break down in the presence of bulk water (Figure 3 — left).

The Adsorbent Media Tubes (Figure 3 — right) do not release any powder since the binder is a durable polymer which is not soluble in water.

The polymeric binder in the adsorbent tube has good temperature and chemical stability. Extended heat trials at elevated temperature with humid air confirm the durability of the adsorbent tubes.

Applying AMT to PSA Nitrogen Generators

AMT has a long life aligned with that of the CMS. It therefore can be integrated into the CMS column and use the purge air used by the Nitrogen generation process for regeneration. This offers the advantage of achieving very dry air at the entry to the CMS adsorption bed but without the requirement for any additional purge air. Additionally the pressure loss across the AMT drying stage is very low. With the elimination of the separate dryer, associated pipe work and filters, a pressure saving in the order of 10 psig (0.7 bar) is achieved. The improved design saves energy and increases the outlet pressure accordingly.

An example of the invention is shown below in Figure 4 The Nitrogen generator design is of modular construction and scalable. Instead of using welded tanks, sets of extruded twin columns are used. Each pair of columns is equivalent to those shown in Figure 1.

Column A and column B are identical. Each has a charge of CMS. Each has an AMT drying module located in the bottom of the column pair. As filtered compressed air enters the bottom of the column it passes through the AMT dryer cartridge and is dried to -40 ˚F (-40 ˚C) PDP which affords a high level of protection from water vapour to the CMS. When the columns are switched over, the columns are vented to atmosphere with all of the exhaust gas passing in a counter-current flow direction followed by a small amount of purge gas which regenerates the AMT dryer preparing the column for re-use. This eliminates the need for an upstream external dryer and its purge losses. Pressure losses across the external dryer are also eliminated which means a higher inlet pressure is possible which enables increased outlet flow to be achieved.

Due to the nature of the AMT material, its service life is in line with the CMS and does not require routine maintenance. Hence the AMT invention provides for a high level of purity of the incoming air which ensures the CMS operates at maximum efficiency since it is not unnecessarily subjected to heavy loads of water vapour.

Modular Nitrogen Generator with Integrated AMT Dryer

This revolutionary design (Figure 5) utilizes high tensile aluminium extrusions which enable light and compact products using common parts to be produced in a production process which provides consistency of design and short production times. Capacity can be readily increased to meet future demand. The common manifolds (top and bottom) provide for the compressed air to be fed into the lower manifold and Nitrogen gas to be delivered from the top manifold. Twin columns containing the AMT integral dryer, the CMS and integrated dust filter are arranged between the manifolds. The number of columns and banks determine the overall capacity. All components are common to each size apart from the manifolds; however, the unique manifold design (patents pending) allows the manifolds to be extended and additional columns added when capacity needs to be increased.

The example shown produces 1589 scfh (45 m3/hour) at 100 psig (7 bar) of Nitrogen, with a purity of 0.5% O_2 content.

Energy Savings

- Elimination of purge air from an external desiccant dryer saves about 20% of the compressor power.
- Simplification by the removal of any type of external dryer will typically save 10 psi (0.7

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bar) or about 5% of compressor power.

- Maintenance costs are reduced due to the simplified system and commonality of components.
- Installation costs are reduced due to less equipment, less labour and reduced transit of product to site.
- Up to 25% energy savings are therefore possible with the use of the integrated AMT dryer technology.
- The compressor size is also reduced by up to 25%.

Conclusions

The opportunity to integrate the drying stage into the CMS column using AMT technology has produced improvements over the prior methodology such that significant operational and economic advantages are achieved. An AMT dryer module was developed to overcome the problems described and enable reliable operation over extended periods to provide the user with a lower through life cost while maintaining a high level of performance. Purge air (typically ~20%) required by external desiccant dryers is eliminated. The integration of AMT technology eliminates pressure losses of an external dryer, typically 10 psi (0.7 bar), resulting in higher inlet pressure to the generator improving Nitrogen yield. AMT has a life expectancy aligned to the CMS and does not require routine maintenance. AMT fully recovers from excessive use, even if flooded with bulk water. The total system is greatly simplified with lower initial and on-going running costs. BP

For more information visit Nano Purification Solutions at www.n-psi.com.

ABOUT THE AUTHOR

Colin Billiet – Former Chief Executive of the domnick hunter group PLC

Past President of the British Compressed Air Society, now an honorary member

Past activities with Pneurop and ISO committees led to the introduction of ISO 8573.1, Quality Classes for Compressed Air Author of many technical papers and patents

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Figure 5 — Modular Nitrogen Generator

COMPRESSED AIR OPTIMIZATION AT CERTAINTEED GYPSUM

By Ron Marshall for the Compressed Air Challenge®

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The CertainTeed Gypsum Board plant located in Winnipeg, Manitoba, has renewed their compressed air system and improved their air quality, as a result of information learned at Compressed Air Challenge's Fundamentals of Compressed Air seminar, some wise choices for new equipment, and thorough investigation of their system. A close look at their distribution system uncovered some surprising results that, once changed, resulted in better system operation. The improvements saved significant operating costs and resulted in a financial incentive from their power utility.

When James Gunning inherited the compressed air system by accepting his job as Engineering Maintenance Manager he knew there were potential improvement opportunities in many of the plant's systems. "I arrived here in September 2008 during the down swing of the economy, about the time of the US credit crisis, so funds were tight." says Gunning, "The system needed renewing because of its age. The refrigerated air dryers were running sub-optimally, the dust collectors were not tuned to be as efficient as possible, and there were times when plant air pressure was reduced." This

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COMPRESSED AIR OPTIMIZATION AT CERTAINTEED GYPSUM

CertainTeed Gypsum is part of Saint-Gobain, the world's largest gypsum board manufacturer. Saint-Gobain at a Glance: www.saint-gobain.com/en/press/saintgobain-glance

pressure loss resulted in slower production and yield. On top of the reduced production, James estimates the plant was spending about $10,000 per year on pneumatic parts

To try to fully understand the plant's issues, the CertainTeed team attended a Compressed Air Challenge seminar to learn about common compressed air issues and what to do about them. They then asked their compressed air supplier to data log their system to determine baseline costing and if there were any improvement opportunities. The power utility, Manitoba Hydro, helped fund the study and analyzed the data. The results showed an existing 100 HP base compressor was running fairly efficiently during full production because it was almost fully loaded, but efficiency dropped off when the loading was light, or when the load increased to a point where the second, older 100 HP compressor was required. There was also a nagging pressure problem in the mill, creating additional maintenance requirements during production equipment service.

Placing pressure loggers at strategic locations throughout the system allowed CertainTeed to visualize what was happening to the pressure as the air passed through the piping and valving on its way to the final end uses. The results of these pressure measurements were very surprising. A very large pressure differential was detected between the compressor room and the mill, where the raw material for the gypsum board was prepared before board production. While the air compressors produced an adequate pressure of between 100 and 105 psi, the data loggers showed the pressure at critical points near the mill dust collectors was only averaging about 80 psi. Further to this there were times where the pressure differential was very high, with the pressure falling as low as 55 psi during short transient events.

The strange thing about the pressure differential was that the plant piping was well designed and was of much larger diameter than the air demand required. An inspection of the piping system showed that there were no sections of piping that should have caused this

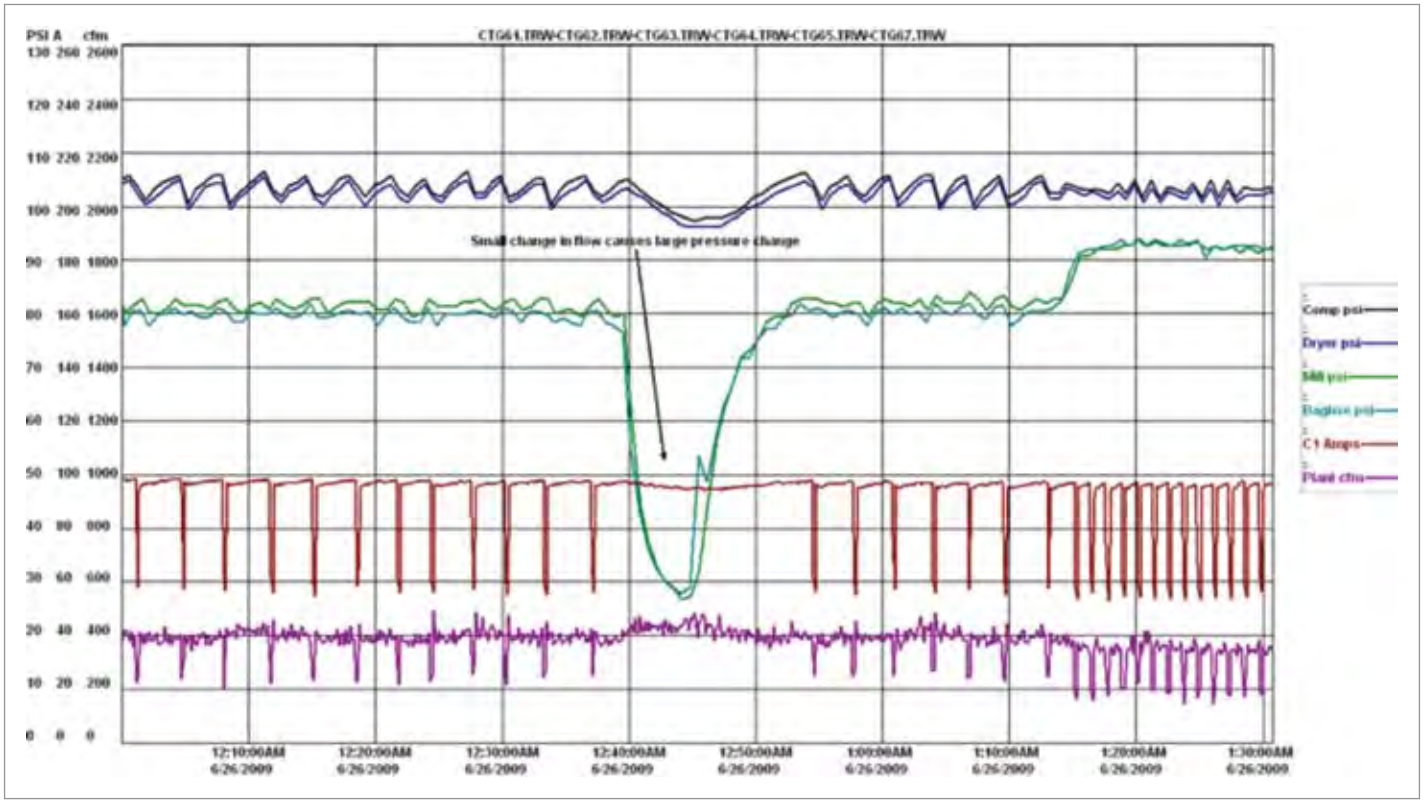

Chart 1: Data logging showed a surprising pressure differential

"With a long international history, which began in France in 1665 when the Royal Glass Works was established, the Saint-Gobain group is now the world leader in habitat and construction markets, providing innovative solutions to save energy and protect the environment."

excessive differential, yet excessive pressure drop was occurring. Additional data logging was done and flow meters were installed to measure the plant flow characteristics. The flow meters showed that at a certain flow point the pressure differential reached so high that no further flow could pass through the restriction in the piping system piping, a sign the compressed air was reaching sonic velocities somewhere in the system.

Further careful inspection and measurement isolated the pressure differential to a section of distribution piping between the point where the air entered the mill area and the dust collector bag houses. Strangely, the pressure differential across smaller, one-inch piping was far less than what appeared across the larger two-inch main piping, yet the flow in these sections was nearly the same. The section of two-inch pipe was very simple, just a fairly straight piece of two-inch pipe, a couple of T connections and a wide open butterfly valve.

In investigating the piping, the maintenance staff finally tried to operate the ball valve and found that, at some point in the past, the valve handle had sheared off of the main valve stem and what looked like a wide open valve was, in fact, a valve that was almost

COMPRESSED AIR OPTIMIZATION AT CERTAINTEED GYPSUM

fully closed. This was an excellent lesson in checking assumptions. A repair was quickly scheduled and the large pressure differential disappeared.

This repair had secondary benefits. "The main issue that it solved was the restoration of adequate compressed air flow and good pressure to our mill," says James Gunning. "Considering that two-thirds of our compressed air consumption is in the mill dust collector bag houses, the improvement was noticeable on the cleanliness of the bags and our ability to tune them for better operation.

From a mechanics standpoint, our Raymond roller mill is a very high maintenance piece of equipment by nature and requires a ¾" air-driven impact gun to get parts apart. Before this particular find, the mechanics were complaining that the impact gun didn't have enough power, but in reality it was related to the failed butterfly valve."

The existing air dryers were of refrigerated style and the peak air flows caused issues when a high flow transient event called the "kettle discharge" occurred. The kettle discharge is a protective event that quickly expels the calcined gypsum from the kettle, a large natural gas heated cooker. During production, in the very rare event that the raw material is left to solidify in the kettle, it is almost impossible to remove. Short duration, high flows of compressed air are used to very quickly expel the material from the vessel. This causes a second compressor to start and run, basically doubling the air loading for a short period of time. The system dryers need to be sized for peak flows to adequately dry this peak compressed air flow. The dryers were also located in a dusty and hot location above the compressor room. This caused additional

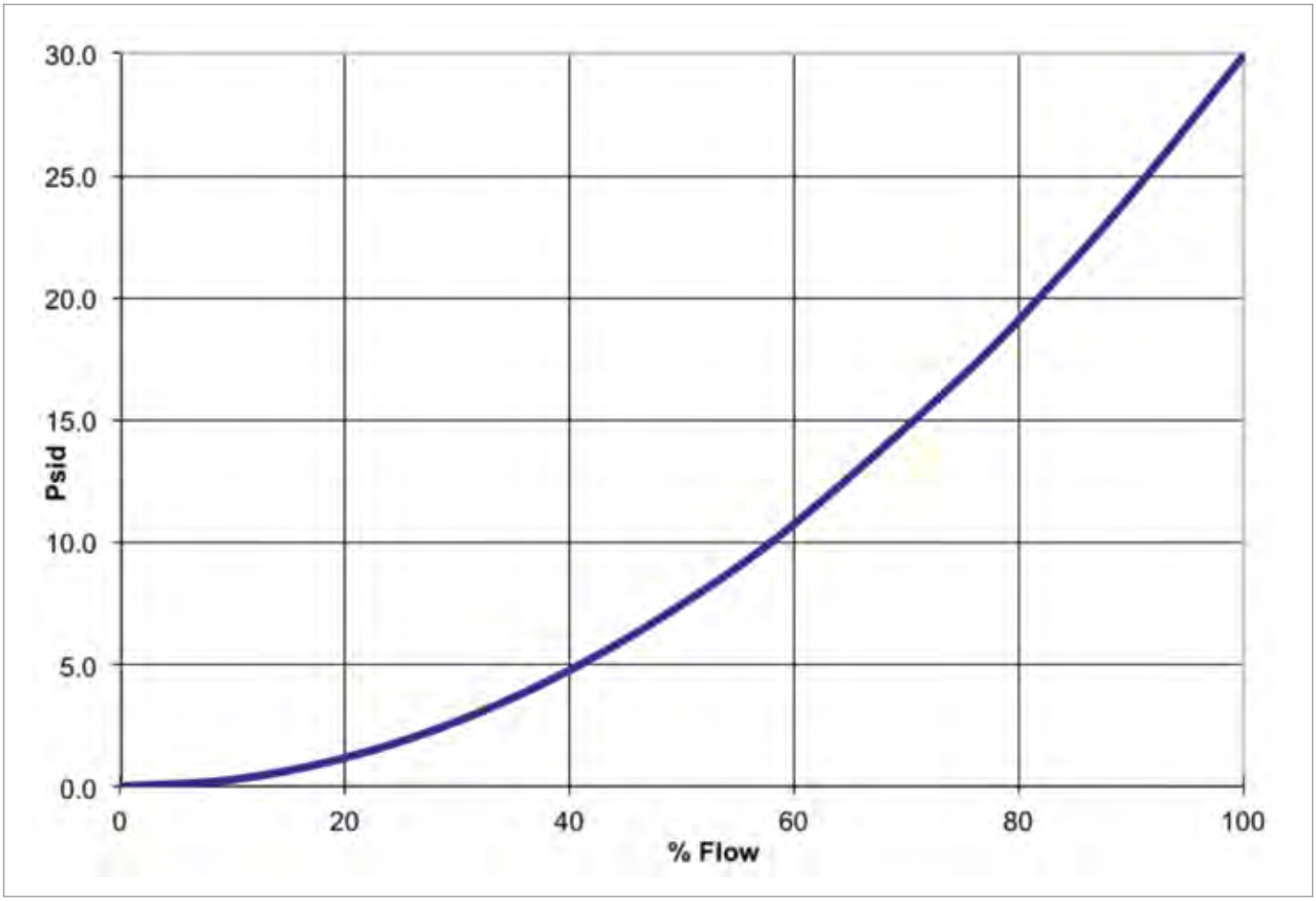

Chart 2: Pressure differential follows an exponential curve, on the steep part of the curve very small flow change results in large pressure differential

"Our current state of the compressed air system is vastly different from five years ago. It was a long and sometimes painful journey, but we are seeing that the results are worth it."

— James Gunning, Engineering Maintenance Manager at CertainTeed Gypsum

maintenance needs over a period of time. Since the mill areas were largely unheated, during the harsh Manitoba winters the air flow was occasionally not adequate to prevent water and ice from forming in colder areas.

But adding a properly sized heatless desiccant air dryer would have presented a problem, the new equipment would have increased the average compressed air loading to a point above the capacity of the main compressor, forcing the second compressor to continually run lightly loaded to make up the difference. This additional 150 cfm of purge loading would have increased both the energy and demand charges by almost double if the existing compressors were used, units that had high unloaded power consumption and inadequate storage capacity with which to work. The estimated kW consumption per 100 cfm, called the specific power, was projected to exceed 23 kW/100 with this new situation, up from a level of 18.6 kW/100, when supplying the 47% increase in compressed air loading caused by a new dryer.

Upgraded System

CertainTeed could have installed a new heatless desiccant dryer with their existing compressors; however, there were significant incentives available from Manitoba Hydro to improve system efficiency and avoid additional costs by purchasing more efficient equipment.

The following enhancements were made to their project:

- Purchase of a 125-HP, premium efficiency two-stage air-cooled variable speed drive (VSD) screw compressor to work with an existing 100-HP compressor
- Installation of an externally-heated desiccant air dryer with dew point dependent control
- Selection of dual inlet filters on the air dryer to reduce pressure differential
- Use of a 3,000-gallon storage receiver to better stabilize the plant pressure during transient peak demands and to make the compressors run

COMPRESSED AIR OPTIMIZATION AT CERTAINTEED GYPSUM

Best Practices for Compressed Air Systems Second Edition

This 325 page manual begins with the considerations for analyzing existing systems or designing new ones, and continues through the compressor supply to the auxiliary equipment and distribution system to the end uses. Learn more about air quality, air dryers and the maintenance aspects of compressed air systems. Learn how to use measurements to audit your own system, calculate the cost of compressed air and even how to interpret utility electric bills. Best practice recommendations for selection, installation, maintenance and operation of all the equipment and components within the compressed air system are in bold font and are easily selected from each section.

better by slowing down load/unload cycle frequency (and VSD start/stop)

- Design and installation of a compressor control system to allow the units to be turned off and back on for weekend shutdown in an orderly fashion
- Recovery of heat of compression to supplement natural gas building heat
- Installation of a permanent power and flow monitoring system to track system Key Performance Indicators (KPIs), further measures of energy efficiency, impact on production yield, and overall quality

"Our current state of the compressed air system is vastly different from five years ago. It was a long and sometimes painful journey, but we are seeing that the results are worth it." says Gunning. "I heard comments from the maintenance shop that our entire system was performing much better and the air is of a better quality now. We had auto drains and can now take them out to save even more air. The last part of the journey will be training the team on the new flow meters to ensure we make the most of the new, high tech system that incorporates additional monitoring capability for improved process control."

Manitoba Hydro estimates the savings for the project are 70 kW peak and 370,000 kWh per year for a 50% savings over the base case. At 2013 rates this saves about $30,000 in operating costs. Further savings of about 8,500 cubic meters of natural gas worth about $2,000 per year are estimated due to heat recovery. The project gained a substantial power utility incentive that covered almost half of the project purchase and installation costs. Simple payback for the project was less than 2 years.

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SHOW REPORT

AERATION BLOWERS AT weftec® 2013

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The 86th annual Water Environment Federation technical exhibition and conference, known as WEFTEC 2013, was held October 5-9 in Chicago's McCormick Place. Show organizers reported record preliminary numbers with 22,598 attendees, 971 exhibitors, and a total net square footage of exhibit space of 297,400.

By Rod Smith, Compressed Air Best Practices® Magazine

The 86th annual Water Environment Federation technical exhibition and conference, known as WEFTEC 2013, was held October 5-9 in Chicago's McCormick Place. Show organizers reported record preliminary numbers with 22,598 attendees, 971 exhibitors, and a total net square footage of exhibit space of 297,400. As usual, I donned my "roving reporter hat", took my "budget camera" and visited as many of the aeration blower vendors as I could.

United Blowers announced their "100% American Manufactured and Assembly" new high-speed turbo blower product line. Based in Georgia and using air foil bearings, United's turbo range is 100 to 300 hp with 8

The "100% American-Made" high-speed direct-driven oil-less turbo blower from United Blower.

psi air flows from 2400 to 3700 cfm. The owner of United Blower, Mr. Vic Miolee, is a walking encyclopedia of blower aeration in wastewater treatment plants. Call him if you want to know what "rise to surge" means. The units all feature local controls, VFD's and sound attenuating enclosures to 75-78 dba. www.unitedblower.com

Kaeser Compressors had their Omega Blowers lined up in an actual installation with two fixed speed and one variable frequency drive unit. Kaeser blower expert, Stephen Horne, explained Kaeser's "system splitting" design philosophy. He said many WWTP's install two large variable speed blowers and these do not provide optimal "wire to air" efficiency as loads often fall below their turndown capabilities. Kaeser recommends running as more fixed speed blowers, at full load, as possible with a reduced number (but larger) VFD units able to avoid any "control gaps". They believe this increases system efficiencies while reducing capital expenditures. Kaeser President Frank Mueller said system splitting combined with adaptive control is making this win/win scenario possible for WWTP's. www.kaeser.com/omega

Atlas Copco/HSI Blowers displayed their full array of high-speed turbos, positive displacement screws and multistage centrifugal blowers. Low pressure turbo blower product manager James Elbro explained the advantages of having such a deep product line. He said WWTP's like seeing the pros and cons of all the technologies without having a vendor with a bias to one technology over the other. Atlas Copco/HSI Blowers announced the new "Frame 5" turbo at the show. This is a 350 hp unit rated for 8000 cfm at 8 psi. www.hsiblowers.com

When the President has the background of an expert blower application engineer, you are talking with Aerzen. Aerzen President Pierre Noack described how they are proposing turbo blowers together with their Hybrid blower. He said this allows them to combine the 2 to 1 turndown ratio of a turbo with the 4 to 1 turndown of the Hybrid- allowing plants a greater ability to maximize efficiency across their broad load profiles. They use the turbo as a base load machine and the hybrid as the trim at the low and high ends of the load profile. Aerzen offers a broad range

Michael Camber, Stephen Horne, and Frank Mueller (left to right) from Kaeser Compressors in front of their Omega Blowers.

James Elbro and Atlas Copco/HSI Blowers announced the new "Frame 5" 350 hp turbo blower rated for 8000 cfm at 8 psi.

Pierre Noack, from Aerzen, with the Delta Hybrid rotary lobe compressor offering a pressure range from +22 psig to -21 "Hg.

SHOW REPORT: AERATION BLOWERS AT WEFTEC® 2013

Todd Nelson, from Gardner Denver's Hoffman & Lamson, in front of their remanufactured multi-stage centrifugal blower and the Revolution high-speed centrifugal blower.

Marc Lindenmuth and GE's Roots Turbo Blower package.

Mike Walther, from Spencer Turbine, introduced the new AyrJet high-speed turbo blower featuring magnetic bearing technology.

of positive displacement, hybrid, and high-speed turbos. As a side note, I was pleased to hear them describe Aerzen USA's significant growth over the past six years. www.aerzenusa.com

Todd Nelson, from Gardner Denver's Hoffman & Lamson, spent some time explaining how they work with clients to make a hybrid installation combining existing (or remanufactured) multi-stage centrifugal blower with their Revolution (featuring magnetic bearings) high-speed centrifugal blower. He says this allows clients to benefit from a lower capital cost expenditure with better energy efficiencies when compared to "turbo only" installations. As multi-stage centrifugals are very efficient at full load, he said, the trick is to establish them as the base load machines. www.hoffmanandlamson.com

It was interesting to meet GE's Roots turbo blower people. As explained by Marc Lindenmuth, GE is an OEM of both the turbo blower technology and advanced aeration control technology. In order to optimize the performance of a wastewater aeration process they use Flow Control, Dissolved Oxygen Control and Most-Open-Valve control principles in combination with proprietary control algorithm used on the Roots blowers. www.ge-energy.com

Gardner Denver's positive displacement blower packages have long been a big partner with the WWTP market. I didn't realize they've been at this for 145 years! GD's Sales Manager for PD blowers, Shawn Boynton, explained that due to this experience, the GD blower service and sales organization across North America is one of the most experienced and expert in the market. He also announced the arrival of the new 6" Heliflow 412. Capable of flows to 3200 cfm, pressure range from 15 psig to 17"Hg, the tri-lobe rotor design uses spherical roller bearings providing a overhung load limit of 13,500 in-lbs vs. the competition at less than 7,999 in-lbs. This eliminates the need for a jack shaft. The new 6" Heliflow reduces noise levels by 4-7 dba as well. www.gardnerdenverproducts.com

Sulzer Pumps introduced their third-generation ABS turbocompressor HST 20. Product Manager Dave Parsons explained they've been using this design, featuring magnetic bearings, since 1996 and have over 1500 direct-driven turbocompressors installed globally. The company places great emphasis on the reliability and stable efficiency they realized with their experience using magnetic bearing technology. This experience has has also allowed them to introduce customer driven full-package features like internal inlet and outlet silencers and blow-off valves, and a standard IEC3 premium-efficient motor and variable frequency drive. www.sulzer.com

Spencer Turbine has long been a major player in the WWTP industry with their multistage cast centrifugal blowers. The company introduced at WEFTEC their new AyrJet high-speed turbo blower product line featuring magnetic bearing technology and integrated non-proprietary controls. www.spencerturbine.com. APG-Neuros, a leading turbo blower manufacturer, announced new stainless steel enclosures as a standard on all their models. The APG-Neuros NX Series is one of the leaders in market share in this category. www.apg-neuros.com

If you are interested in attending WEFTEC 2014, it will be held September 27 – October 1, 2014 in New Orleans. BP

For more information contact Rod Smith, Compressed Air Best Practices Magazine, tel: 412-980-9901, email: rod@airbestpractices.com or visit WEFTEC at www.weftec.org

To read more ***Wastewater Industry*** articles, visit
www.airbestpractices.com/industries/wastewater

Carmen Cerrelli, from APG-Neuros, announced standard stainless steel enclosures for their NX Series turbo blowers.

Shawn Boynton and John Troyer (left to right) from Gardner Denver, next to their IQ Positive Displacement Blower Package.

Roland Winterland and Dave Parsons (left to right) from Sulzer Pumps next to the new ABSturbocompressor HST 20

SHOW REPORT: 2013 WEEC World Energy Engineering Congress

By Rod Smith, Compressed Air Best Practices® Magazine

➤ Pump Up Innovation and Green Technologies

The 2013 edition of the annual World Energy Engineering Congress (WEEC) was held September 25-27 at the Washington Convention Center in Washington D.C. Produced by the Association of Energy Engineers (AEE), the event brings Energy Managers working for commercial building and industrial organizations, together with energy efficiency technology and system assessment providers. The AEE has a strong membership base of over 16,000 professionals in 89 countries with 82 chapters located throughout the U.S. and abroad.

A highlight for me was friend and Editorial Board Member, Thomas Mort, being honored as the AEE's "Energy Manager of the Year." Thomas is the Energy Director at Archer Daniels Midland where they realized and verified energy-saving projects totaling more than $50 million in annual savings in 2013. Congratulations Thomas!

Our Editorial Board Member Thomas Mort, Energy Director for Archer Daniels Midland, was honored as the "Energy Manager of the Year" by the Association of Energy Engineers.

The WEEC Conference Opening Session, on September 25th, featured Alabama Senator Jeff Sessions, former California Governor Arnold Schwarzenegger, Kateri Callahn from the Alliance to Save Energy, and Jim Bolte-President of Toyota Motor Manufacturing Alabama.

While all the speakers were excellent, "Arnold" was a hit. Many people don't realize that he is widely given credit for having turned California into the U.S. leader in green technology business growth while significantly improving California air quality and reducing carbon emissions. Other U.S. states have followed California's lead in forcing automakers to comply with higher miles per gallon targets and stricter emissions regulations. Schwarzenegger said "the car makers fought these new laws like crazy. When they realized it was going to happen, they jumped on board and now are taking a leadership role." Delivered with his famous high-energy and humorous approach, Governor Schwarzenegger's speech focused on "don't wait for Washington DC to do it" and provided his track record in California as an example for letting the states drive the new green economy forward. Secondly, he focused on "pumping up the environmental message" with positive news. He said environmentalists made a mistake, years ago, by turning the conversation into a guilt story. Humorously, he said he has a natural gas powered Hummer and feels great about it!

Compressed Air at the WEEC

The compressed air industry is present at the WEEC. There were a number of compressed air technology companies exhibiting and Compressed Air Best Practices® Magazine chaired an afternoon conference session titled, "Best Practices in Compressed Air."

Roger Dennison, from CDI Meters, took the time to introduce me to the new CDI 25 flow meter. These meters allow low-cost monitoring of individual pieces of plant equipment where central data collection, on compressed air flow, is not required. They provide adjustable data smoothing, averaging, as well as blinking-light alarms for high average flow and high minimum flow (an indication of leakage). As regular readers, know, I'm a big fan of demand-side compressed air flow measurement!

Kaeser Compressors had a nice booth where Wayne Perry and Neil Mehltretter reviewed Kaseser's Energy Management Services with

Diane Capodilupo and Roger Dennison, from CDI Meters, displayed the new CDI 25 demand-side flow meter.

Craig Garbrick and Tim Brown, from Atlas Copco, reviewed new technologies like the GAVSD+ and the SmartLink remote monitoring system (left to right).

Neil Mehltretter and Wayne Perry, from Kaeser Compressors, discussed their Energy Management Services including the ADA Air Demand Analysis (left to right).

SHOW REPORT: THE 2013 WORLD ENERGY ENGINEERING CONFERENCE

James Smith, an intern at Compressed Air Best Practices® Magazine, signs up booth visitors to subscriptions and practiced spanish with attendees from South America.

Nitin G. Shanbhag, from Hitachi Air Technologies, presented a paper titled, "Ambient Air's Impact on Compressed Air System Efficiency."

booth visitors. Highlighted by the Kaeser Air Demand Analysis (ADA), the company does a great job educating end users on the importance of measuring what is happening in a compressed air system.

Atlas Copco Compressors displayed their line-up of new energy-efficent compressed air system technologies. Tim Brown and Craig Garbrick were working the booth and talking about the new GAVSD+ range of air compressors featuring the integration of a new interior permanent magnet motor with the compressor element. Reduce energy consumption, space requirements, and sound levels are the result. They also discussed the SmartLink remote monitoring device that will come standard on most air compressors beginning in late 2013. Exciting to me is the SmartLink basic level will be free to clients-think of how many more plants will start measuring energy performance!

Cascade Energy introduced their SENSEI web-based energy efficiency platform. Dan Brown and Dave Whitmore took some time out to demonstrate how Energy Managers can use this system to establish baselines for total kWh and the subsystems and then to drive action by tracking and measuring Key Performance Indicators. Cascade Energy is the leading energy engineering firm in the Northwest and they developed this product based on their own experiences doing energy audits and managing energy for their clients. I was very impressed and recommend people take a look at this system at www.energysensei.com

Our conference session titled, "Best Practices in Compressed Air", was well attended — including our loyal Energy Managers on our Editorial Board! We thank our industry experts who gave excellent presentations:

- Frank Moskowitz, Draw Professional Services
  "Balancing your Compressed Air System-Tips on Increasing Productivity while Saving Energy"
- Frank Langro, Festo Corporation
  "Right-Sizing Pneumatics to Reduce Energy Usage"
- Nitin G. Shanbhag, Hitachi Air Technology Group
  "Ambient Air's Impact on Compressed Air System Efficiency"
- Wayne Perry, Kaeser Compressors
  "Hybrid Refrigerated/Desiccant Compressed Air Dryers"

The WEEC has the most meaningful conference tracks, on energy management, that I am aware of. If you are interested in attending next year, it will be held October 1-3, 2014 again in Washington D.C. BP

For more information contact Rod Smith, Compressed Air Best Practices Magazine, tel: 412-980-9901, email: rod@airbestpractices.com or visit the Association of Energy Engineers at www.aeecenter.org

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Sustainable Energy Savings with Compressed Air Best Practices®

Compressed Air Best Practices® is a technical magazine dedicated to discovering **Energy Savings** in compressed air systems. Each edition outlines **Best Practice System Assessments** for industrial compressed air users — particularly those **managing energy costs in multi-factory companies.**

"Retrofitting the 8 case packing machines with 3-position valves reduced our idle cfm from 80 to 15 cfm – on each case packer. With the right air compressor controls allowing the electric motors to turn down, the annual energy savings from one case packer paid for the whole project."

– Gregory Rhames, Asset Reliability Manager/Site Energy Manager, Verallia Glass, Jan/Feb 2012 Edition of Compressed Air Best Practices®

"Demand Side" and "Supply Side" information on compressed air technologies and system assessments is delivered to readers to help them save energy. For this reason, we feature Best Practice articles on when/how to correctly apply **air compressor, air treatment, measurement and control, pneumatic, blower and vacuum technology.**

Industrial energy managers, utility incentive program managers, and technology/system assessment providers are the three stakeholders in creating energy efficiency projects. Representatives of these readership groups guide our editorial content. The Compressed Air Best Practices® Editorial Advisory Board guides our mission to help create more energy saving projects.

To subscribe visit airbestpractices.com

WHY DO COMPRESSED AIR

By the Compressed Air & Gas Institute

➤ Introduction

Mention utilities and energy in a discussion about manufacturing and the Big Three — water, electricity and natural gas — immediately come to mind. But compressed air is commonly accepted as a manufacturing facility's fourth utility. A careful examination of a facility's compressed air system will likely reveal several opportunities to improve the performance of the system by effectively and efficiently removing moisture that may be present. The Compressed Air and Gas Institute (CAGI) will be issuing a series of articles discussing moisture in the compressed air system and will provide a brief overview of the compressed air drying technologies available.

Why Do Compressed Air Systems Need Drying?

Moisture is Always Present

All atmospheric air contains some water vapor, which will begin to condense into liquid water in the compressed air or gas system when the air or gas cools past the saturation point, i.e., the point where it can hold no more water vapor. The temperature at which this happens is known as the **dew point.** This dew point becomes all-important in determining how much compressed air drying is needed.

The increased use of compressed air and the development over the years of many new and more sophisticated devices and controls has increased the need for clean dry air. Hence, drying technology advanced, and dryers came into general use. CAGI and their Air Drying & Filtration Section remain committed to educate users on this topic.

Moisture is Damaging

Moisture in compressed air used in a manufacturing plant causes problems in the operation of pneumatic systems, solenoid valves and air motors and can adversely affect the process or product being manufactured. For many years, problems from moisture in compressed air lines were simply tolerated as unavoidable. Moisture:

- Causes rust and increased wear of moving parts in production equipment as it washes away lubrication
- Can adversely affect the color, adherence, and finish of paint applied by compressed air
- Can jeopardize process industries where many operations are dependent upon the proper functioning of pneumatic controls. The malfunctioning of these controls due to rust, scale, and clogged orifices can result in damage to product or in costly shutdowns
- Can freeze in control lines in cold weather, which may cause faulty operation of controls
- Causes corrosion of air or gas operated instruments, giving false readings, interrupting or shutting down plant processes

Plant Air — In almost every operation, clean, dry compressed air will result in lower operating costs. Dirt, water and oil entrained in the air will be deposited on the inner surfaces of pipes and fittings, causing an increase in pressure drop in the line which results in a loss of performance efficiency.

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SYSTEMS NEED DRYING?

Liquid water accelerates corrosion and shortens the useful life of equipment and carry-over of corrosion particles can plug valves, fittings and instrument control lines. When water freezes in these components, similar plugging will occur.

Valves and Cylinders — Deposits of sludge formed by dirty, wet and oily air, acts as a drag on pneumatic cylinders so that the seals and bearings need more frequent maintenance intervals. Operation is slowed down and eventually stopped. Moisture dilutes the oil required for the head and rod of an air cylinder, corrodes the walls and slows response. This results in loss of efficiency and production.

Moisture flowing to rubber diaphragms in valves can cause these parts to stiffen and rupture. Moisture also can cause spools and pistons to pit. In high-speed production, a sluggish or stuck cylinder could create costly downtime. A clean, dry air supply can prevent many of these potential problems.

Air Powered Tools — Pneumatic tools are designed to operate with clean, dry air at the required pressure. Dirty and wet air will result in sluggish operation, more frequent repair and replacement of parts due to sticking, jamming and rusting of wearing parts. Water also will wash out the required oils, resulting in excessive wear. A decrease in pressure at the tool caused by restricted or plugged lines or parts will cause a reduction in the efficiency of the tool.

Clean, dry air at the required pressure will enable the production worker to start operating immediately at an efficient level, with no time lost to purge lines or drain filters and will help to maintain productivity and prolong tool life.

Instrument Air — Control air supplied to transmitters, relays, integrators, converters, recorders, indicators or gauges is required to be clean and dry. A small amount of moisture passing through an orifice can cause malfunction of the instrument and the process it controls. Moisture and resultant corrosion particles also can cause damage to instruments and plug their supply airlines. Pneumatic thermostats, which control the heating and air conditioning cycles in large and small buildings, also require clean, dry air.

Instruments and pneumatic controllers in power plants, sewage treatment plants, chemical and petrochemical plants, textile mills and general manufacturing plants, all need clean, dry air for efficient operation.

CAGI® Compressed Air & Gas Institute
www.cagi.org

Preservation of Products — When used to mix, stir, move or clean a product, air must be clean and dry. For example, oil and water in compressed air used to operate knitting machinery will cause the tiny latches on the knitting needles to stick. When used to blow lint and thread off finished fabrics, contaminants in the air may cause product spoilage.

If air is used to blow a container clean before packaging, entrained moisture and oil may contaminate the product. Moisture in control line air can cause the wrong mixture of ingredients in a bakery, the incorrect blend in liquor, waterlogged paint, or ruined food products.

In some printing operations, air is used to lift or position paper, which will be affected by dirty, wet air and any water on the paper will prevent proper adhesion of the inks.

In pneumatic conveying of a product such as paper cups or cement, dry air is essential.

Test Chambers — Supersonic wind tunnels are designed to simulate atmospheric conditions at high altitudes where moisture content is low. These chambers use large volumes of air, which must be dried to a very low dew point to prevent condensation in the tunnel air stream.

Selecting the Right Compressed Air Dryer

Before looking at the several types of dryers available, we need to look at what to consider in deciding which dryer is best for the specific requirements.

Know the Specific Uses of the Compressed Air — The selection of an air dryer is done best by the professional who knows or learns the particular end uses, the amount of moisture which each use can tolerate and the amount of moisture which needs to be removed to achieve this level. Air, which may be considered dry for one application, may not be dry enough for another. Dryness is relative. Even the desert has

WHY DO COMPRESSED AIR SYSTEMS NEED DRYING?

moisture. There is always some moisture present in a compressed air system regardless of the degree of drying.

For compressed air, the best way to specify dryness is to cite a desired pressure dew point. Different types of dryers, therefore, are available with varying degrees of pressure dew point performance. To specify dew point lower than required for an application is not good engineering practice. (Naming a pressure dew point is how to state the degree of dryness wanted.) It may result in more costly equipment and greater operating expense.

Know the Temperatures — To determine whether or not the compressed air will remain sufficiently dry, we must know the end use of the air and the temperature at which it must work. In an industrial plant where the ambient temperature is in the range of 70 ˚F or higher, a dryer capable of delivering a pressure dew point 20 ˚F lower than ambient, or 50 ˚F, may be quite satisfactory.

Summer temperatures do not require a very low dew point whereas winter temperatures may dictate a much lower dew point. In winter, the temperature of the cooling medium, air or water, usually is lower than in summer, resulting in a variation of the air temperature to the dryer. This will affect the size of the dryer needed, since the same dryer must work in both summer and winter temperatures and relative humidities.

Many chemical processing plants, refineries, and power plants distribute instrument and plant air throughout the facility with lines and equipment located outside the buildings. In such plants two different temperature conditions exist at the same time in the same system. Also, a dryer which may be satisfactory for high daytime temperatures, may not be satisfactory for lower nighttime temperatures. In areas where freezing temperatures are encountered, a lower pressure dew point may be required. In general, the dew point should be specified 20 ˚F lower than the lowest ambient temperature encountered in order to avoid potential condensation and freezing. To specify a winter dew point when only summer temperatures will be encountered, can result in over-sizing the equipment and increased initial and operating costs. A system designed to dry air for cold weather conditions will greatly increase operating costs if used year round.

For plant air and instrument air, primary considerations in specifying a dryer are condensation and freezing. In a system where a lot of internal pipe corrosion could occur, high humidity in the air stream should be avoided.

Know the Actual Performance – While many dryers have a standard rating of 100 ˚F saturated inlet air temperature and 100 PSIG operating pressure, it is important to check on the actual performance of the units obtained in actual plant operating conditions.

Know Each Use — In addition to plant and instrument air applications, there are many other uses requiring moisture removal to a low dew point. For example, railroad tank cars, which carry liquid chlorine, are padded (charged) with compressed air to enable pneumatic unloading. Chlorine will combine with water vapor to form hydrochloric acid; therefore, the compressed air must have minimum moisture content to prevent severe corrosion. Droplets of moisture in wind tunnel air at high- testing velocities may have the effect of machine gun bullets, tearing up the test models. Air used for low temperature processing (for example, liquefaction of nitrogen or oxygen) can form ice on cooling coils, thus requiring defrosting. The lower the moisture content of the air, the longer the periods between defrosting shutdowns.

For these and similar temperature applications, compressed air must not only be free of liquid phase water but must also have a minimum content of vapor phase water. Usually specified for these requirements are dew points in the range of -40 ˚F to -100 ˚F at pressure.

Compressed Air & Gas Institute — The Compressed Air and Gas Institute is the united voice of the compressed air industry, serving as the unbiased authority on technical, educational, promotional, and other matters that affect the industry. The next article in the series will focus on the different types of compressed air dryers and the features and benefits of each type. BP

For more detailed information about Compressed Air Dryers, CAGI, its members, compressed air applications and other educational resources on compressed air, visit the CAGI web site at www.cagi.org

AIR QUALITY CLASSES ENCOMPASSING POLLUTANTS HAVE BEEN ESTABLISHED IN AN INTERNATIONAL STANDARD ISO 8573-1. FOR MOISTURE CONTENT, THESE ARE AS FOLLOWS:		
CLASS	MAXIMUM PRESSURE ˚C	DEW POINT ˚F
1	-70	-100
2	-40	-40
3	-20	-4
4	+3	+38
5	+7	+45
6	+10	+50
7	Not specified	

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RESOURCES FOR ENERGY ENGINEERS

TECHNOLOGY PICKS

New DENT Current Amplifier

DENT Instruments, a global leader in the design and manufacture of power and energy measurement instruments, announced the launch of the RōCoil TCA-5™, a three-channel integrating transconductance amplifier that translates the electrical output signal from the RōCoil™ current sensor to a 5 amp AC current, emulating a traditional current sensing transformer. The DENT RōCoil TCA-5™ delivers the flexibility and ease-of-installation of the RōCoil flexible current sensors to applications using power meters with 5A current transformer inputs.

DENT RōCoil flexible current transformers offer significant advantages over conventional split-core or clamp-on CTs. These "rope-style" CTs deliver installer-friendly features such as large window size, wide current range, and mechanical flexibility for mounting in tight quarters. RōCoil CTs have a broad amperage range from 5-5000A AC and are available in four lengths from 16" to 72".

"Ever since introducing the flexible RōCoil CTs, we have been asked if we manufactured a flexible coil with a 5A output," says Christopher Dent, President of DENT Instruments. "We are very excited to announce that the RōCoil TCA-5 fills this requirement in the marketplace. Customers who use 5A current input power meters will now be able to enjoy the easy installation offered by RōCoil flex probe CTs."

The RōCoil TCA-5 can be DIN or panel mounted and has four selectable current ranges. It can be used on 50 or 60 Hz systems.

www.dentinstruments.com

New HOBO Thermocouple Data Logger

Onset, a world leader in data loggers, today announced the HOBO UX120 Thermocouple Logger, a four-channel LCD data logger for measuring and recording temperature in a broad range of monitoring applications.

Starting at just $275, the compact HOBO UX120 Thermocouple Logger offers a dramatic price/performance advantage over competitive products by combining a full-featured, deployment-friendly LCD display and flexible support for a variety of plug-in thermocouple probes.

The new logger makes it easy and convenient to record temperatures over a broad range (-260 ˚ to 1820 ˚C) and can accept up to four J, K, T, E, R, S, B, or N type probes. This flexibility enables the logger to be used in a range of monitoring projects. For example, food quality assurance managers will use the four-channel thermocouple loggers to profile oven temperatures at various points to ensure product quality. Civil engineers will use the loggers to document concrete temperatures at multiple depths during the curing process. And, research scientists will use the loggers in a range of projects, from wildfire ecology research to bird nesting studies.

In addition to accepting four thermocouple sensors, the logger features an internal temperature sensor for logging ambient temperatures, further extending the range of application possibilities.

The HOBO UX120 Thermocouple Logger streamlines temperature monitoring applications in a number of ways. For example, it features an easy-to-view LCD that visually confirms logger operation and battery status, eliminating the need to connect the logger to a computer to view the information. As the logger records temperatures, the LCD refreshes every 15 seconds to provide a near real-time readout of current temperatures as well as minimum, maximum, average, and standard deviation statistics. On-screen alarms can be set for each temperature channel to notify users if temperatures exceed high or low thresholds.

The logger also features a large memory capacity capable of storing 1.9 million measurements. This enables the loggers to be deployed for longer periods between offloads. Firmware is user upgradeable, and the logger offers start, stop, and restart pushbuttons to make installation fast and easy.

RESOURCES FOR ENERGY ENGINEERS

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ADVERTISER INDEX

Company	Page	Web Site
Kaeser Compressors	Outside Back Cover	www.kaeser.com/CABP
Association of Energy Engineers	Inside Back Cover	www.aeeprograms.com/shows
Atlas Copco	Inside Front Cover	www.atlascopco.us/gamechangerusa
Hitachi	3	www.hitachi-america.us/ice/atg
SPX Hankison	6	www.spx.com
Sullair	7	www.sullair.com
Titus Air Systems	8	www.titusair.com
BEKO Technologies	9	www.bekousa.com
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Sullivan Palatek	13	www.sullivanpalatek.com
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Michell Instruments	29	www.michell.com/us
Trace Analytics	31	www.AirCheckLab.com
DV Systems	33	www.dvcompressors.com

TECHNOLOGY PICKS

Once data has been recorded with the HOBO UX120 Thermocouple Logger, it can be easily viewed in graph form and analyzed using Onset's HOBOware® Pro software. Time-saving tools allow users to batch-configure and readout dozens of loggers in a fraction of the time it would take with previous generations. The software also features a Bulk Export tool that allows users to export data files to text format for use in spreadsheets.

The HOBO UX120 Thermocouple Logger is available immediately from Onset and is priced at $275

Visit Onset on the web at http://www.onsetcomp.com

New Powerful Flat Air Nozzle Saves Space and Money

EXAIR's new 1" Flat Super Air Nozzle produces a flat 1" (25mm) wide airstream with a strong blowing force of 9.8 ounces (278g) when mounted 12" (305mm) from the target. The unique design of this super-efficient nozzle makes it an ideal fit for both tight spaces and tight budgets.

The 1" Flat Super Air Nozzle uses EXAIR's patented technology to maximize entrained airflow while reducing noise levels. A precise amount of air is released through the .015" (0.38mm) air gap opening that is set with a stainless steel shim positioned between the body and removable cap. The airstream pulls in surrounding room air to produce a wide, forceful stream of high velocity,

TECHNOLOGY PICKS

laminar airflow. Air consumption is 10.5 SCFM at 80 PSIG. The 75 dBA sound level is below the limits of the OSHA maximum allowable noise exposure standard 29 CFR 1910.95(a). Force and flow may be easily adjusted by installing different shim thicknesses. Optional swivel fittings and Stay Set Flexible Hoses to aim the nozzle are also available.

The 1" Flat Super Air Nozzle is available in zinc aluminum alloy construction, suitable for rugged industrial applications. Applications include ejecting heavy parts and slugs, chip removal, part cleaning, drying, liquid blowoff and cooling. Price is $39.

For more information contact: EXAIR Corporation
Phone: (800) 903-9247
Fax: (513) 671-3363
E-mail: techelp@exair.com
www.exair.com/1san.htm

Baghouse Performance Analyzer & Controller

The company's B-PAC series of Baghouse Performance Analyzers & Controllers feature a combination of features to help powder processing, air pollution control and dust collection users meet regulatory compliance while simultaneously reducing operating costs and improving the process.

The controllers tightly integrate control, sensing and high speed digital signal analysis to provide time and money saving diagnostics including: the ability to detect/locate filter leaks weeks before emissions are visible; the ability to detect/locate failed pulse solenoids that can lead to plugged filters; and the ability to instantly detect/locate ruptured or frozen pulse-jet diaphragms.

The controller also provides intelligent filter cleaning which extends filter life and lowers emissions while reducing compressed air use by 15-40% over traditional PLC programming and up to 90% over continuous cleaning.

Optional software provides enhanced process control features and further automation of compliance record keeping. A series of models for small cartridge collectors to large multi-compartment baghouses are available. The controllers are easy-to-use, high quality, heavy duty products designed for long-life in harsh process environments. A range of analog and digital I/O are available as well as all major fieldbuses including Ethernet IP, Modbus TCP, DeviceNet and Profibus etc.

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www.filtersense.com
800 Cummings Center, 355W
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Advertising & Editorial: Rod Smith
rod@airbestpractices.com
Tel: 412-980-9901

Subscriptions & Administration: Patricia Smith
patricia@airbestpractices.com
Tel: 412-980-9902

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The Regional Sales Manager may reside anywhere within the territory and will be expected to travel extensively when not working from his or her home office. Experience in the compressed air industry is preferred.

Interested? Please send your resume with cover letter to nicolas.dedeken@energair.com

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- Bachelor Degree preferred
- Sales and technical support pre-sales and after-sales skills
- Excellent skills in relationship-building

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Interested candidates please send resume and cover letter to: info@aircom.us.com

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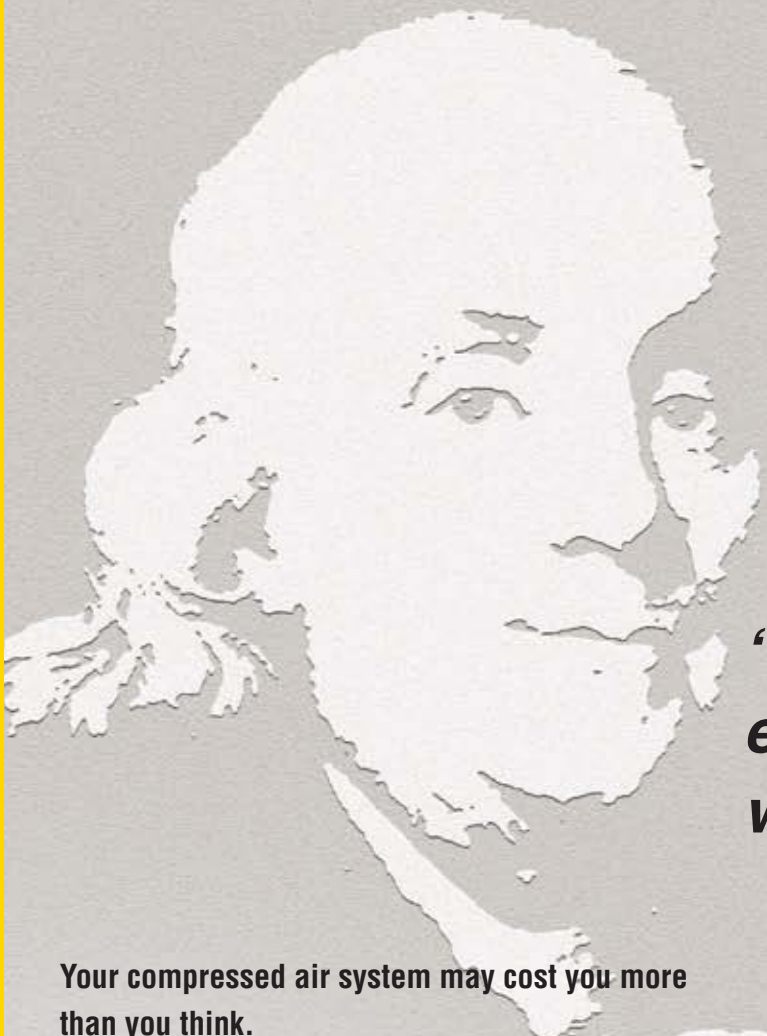

"Beware of small expenses. A small leak will sink a large ship."

— Benjamin Franklin

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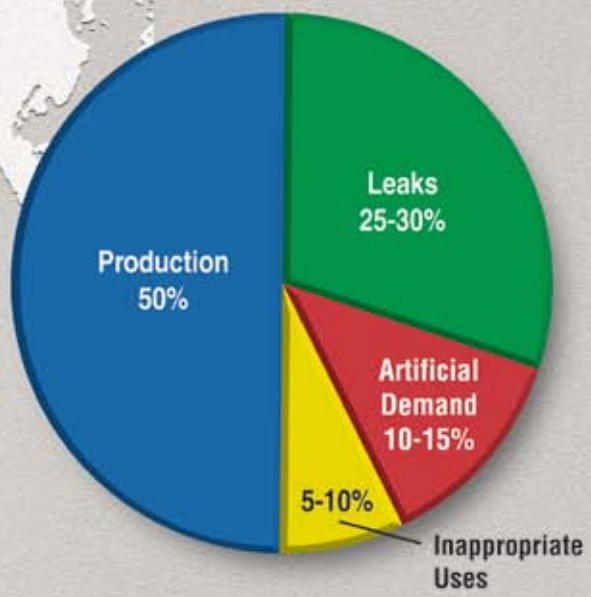

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